Statement of
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Mr. Chairman, Senator Reid, and Members of the Subcommittee, it is a pleasure to be here to discuss the Fiscal Year (FY) 2004 budget submission for DOE's Office of Nuclear Energy, Science and Technology.

Over the last thirty years, nuclear power has risen to become the second most important source of electric energy in the United States and at the same time, the most operationally economic. The benefits of nuclear power as a clean, reliable and affordable source of energy are a key to the economic and environmental underpinnings of this Nation. A central mission of the Department's nuclear energy research program is to help enhance the basic technology and, through some of the most advanced civilian technology research conducted today, chart a course to the next leap in technology. In FY 2004, we are proposing a $388 million investment in nuclear research and development and for the Nation's nuclear science, technology and education infrastructure, a 6 percent increase over the current year appropriation.

This budget request responds to the President's priorities to deploy new generation capacity to fortify U.S. energy independence and security while making significant improvements in environmental quality. It builds on the important work started over the last two years to deploy new nuclear plants in the U.S. by the end of the decade, to develop advanced, next generation nuclear technology, to strengthen our Nation's nuclear education infrastructure, and it proposes exciting new priorities.

In FY 2004, we propose to launch the *Nuclear Hydrogen Initiative* to use high temperature nuclear energy systems for clean hydrogen production as part of the President's Hydrogen Fuel Initiative. We are also proposing the *Advanced Fuel Cycle Initiative* with research aimed at developing proliferation-resistant fuel treatment and fuel cycle technologies that can reduce the volume and toxicity of commercial spent nuclear fuel and maximize energy from nuclear fuel.

During FY 2002, we pursued significant management reforms in order to implement the President's Management Agenda (PMA), including a major reorganization to better reflect the Administration's priorities, improve overall management and reduce the number of primary organizational units from eight to three. To assure overall accountability, PMA performance measures were cascaded from the Director through our Associate Directors to the staff. We also placed great emphasis on developing meaningful R&D investment criteria and applying the criteria to our nuclear research initiatives. The nuclear program successfully recruited and hired new junior professional staff and we are working to put a new senior management team in place at the Idaho

Operations Office, who will oversee the Department's activities at the INEEL and lead the continuing transition of this laboratory back to its nuclear research roots.

The NE budget request also supports the infrastructure for production of medical research isotopes, space and national security power systems, and the site and security infrastructure for Argonne National Laboratory-West in Idaho. I will now provide you more detail on our nuclear R&D initiatives and the linkages between them.

ADVANCED FUEL CYCLE INITIATIVE

Of the issues affecting future expansion of nuclear energy in the U.S. and worldwide, none is more important or more difficult than that of dealing effectively with spent nuclear fuel. After a long and difficult process, the country is moving forward with a geologic repository, and we are on schedule to submit a license application to the Nuclear Regulatory Commission by the end of 2004.

With these successes, we are able to pursue research that can optimize the use of the first repository and possibly reduce the need for future repositories. As one of the Secretary's capstones, the FY 2004 Budget proposes an aggressive research and demonstration program - the *Advanced Fuel Cycle Initiative* - with an investment of $63 million in FY 2004 to explore advanced, proliferation-resistant nuclear fuel treatment and transmutation technologies that can reduce volume and toxicity of spent nuclear fuel for a geologic repository. If successful, these same technologies offer benefits of enhancing national security by reducing inventories of commercially-generated plutonium and enhancing energy independence by recovering the energy value contained in spent nuclear fuel.

The Department is proposing a research program leading to demonstrate proliferation-resistant fuel treatment technologies to reduce the volume and radioactivity of high level waste, and the development of advanced fuels that would enable consumption of plutonium using existing light water reactors or advanced reactors. With the President's request, the Department will continue work toward demonstration of proliferation-resistant fuel treatment technology and continue design of transmutation fuels for future use with current reactor technologies.

For the Advanced Fuel Cycle Initiative to be successful, advanced fuel treatment and transmutation research and development must be integrated with the development of *Generation IV* nuclear energy systems, particularly with those reactor technologies that can produce very high energy neutrons that would be needed to transmute a wide variety of toxic radioactive species. To support this goal, the Advanced Fuel Cycle Initiative will develop the advanced proliferation resistant fuels and fuel cycle systems for *Generation IV* reactors.

GENERATION IV NUCLEAR ENERGY SYSTEMS

Two years ago, we launched the *Generation IV* program to develop advanced reactor technologies for commercial deployment after 2010 but before 2030. These advanced reactors offer significant advances in sustainability, proliferation-resistance, physical protection, safety and economics. Development of these reactors is being pursued by the *Generation IV International Forum*, a group of ten leading nuclear nations (United Kingdom, Argentina, Brazil, Canada, France, Japan, Republic of Korea, Republic of South Africa, Switzerland, and the United States), which last year selected six promising technologies for joint research, development, and demonstration. While the Department has not yet decided upon which of these technologies it will eventually focus, all of the technologies are of considerable interest. The six innovative, next-generation technologies include two gas-cooled reactors, one water-cooled reactor, two liquid-metal-cooled reactors, and a molten salt-based reactor concept.

Key research objectives for these technologies will include such activities as demonstrating advanced fuels and materials. The goal of the initiative is to resolve the fundamental research and development issues necessary to establish the viability of these concepts. By successfully addressing the fundamental research and development issues, the concepts are highly likely to attract future private sector sponsorship and ultimate commercialization. In FY 2003 and FY 2004, the Department will establish international partnering agreements to guide joint research and begin research and development on several of the reactor concepts, including very high temperature reactors that would support cost-effective production of hydrogen.

NUCLEAR HYDROGEN INITIATIVE

Generation IV is closely linked to our new *Nuclear Hydrogen Initiative*, aimed at demonstrating economic commercial-scale hydrogen production using nuclear energy. Today, through electrolysis, we can convert water to hydrogen using electricity but we believe that for the future, very high temperature reactors coupled with thermo-chemical water splitting processes offer a more efficient technology for production of large quantities of hydrogen, without release of greenhouse gases.

The hydrogen initiative grew out of the success of our *Nuclear Energy Research Initiative*, in particular, two investigator-initiated projects that identified a number of advanced reactor concepts capable of producing large quantities of hydrogen with high efficiency and low cost. Since then, we have awarded three additional NERI projects to study nuclear production of hydrogen. Beginning this year and under the international component of NERI (I-NERI), we are working in cooperation with Commissariat d'Energie Atomique (CEA) on a three-year effort to develop laboratory scale demonstration of the thermo-chemical water splitting process.

The funds provided in FY 2003 will allow us to accelerate the Nuclear Hydrogen Technology Roadmap so that by FY 2004, we would begin implementing the research and development that is defined by the roadmap. We would also continue exploring laboratory scale demonstration of some of the key processes involved in nuclear hydrogen production, such as other thermo-chemical water splitting processes or high temperature electrolysis as well as development of high temperature heat exchangers.

NUCLEAR POWER 2010

The President's budget supports continuation of *Nuclear Power 2010* in FY 2004 to demonstrate, in cost-shared cooperation with industry, key regulatory processes associated with licensing and building new nuclear plants in the U.S. by the end of the decade. As concluded in a business case study conducted in 2002 by financial advisory firm Scully Capital, addressing key financial and business risks associated with building and licensing the first few nuclear plants is essential to proceeding with new nuclear plants in the United States.

In FY 2004, the requested funds will continue to support the activities associated with submitting and achieving Nuclear Regulatory Commission (NRC) approval of early site permits and development of Combined Construction and Operating License applications.

Last year, the Department initiated cooperative cost shared projects with three generating companies – Entergy in Mississippi, Dominion in Virginia, and Exelon in Illinois, to demonstrate the new regulatory process for siting new nuclear power plants. These companies are pursuing applications for Early Site Permits for new plants at sites where they currently operate nuclear power plants – at Entergy's Grand Gulf site, Dominion's North Anna site, and at Exelon's Clinton site. The Early Site Permits will be submitted to the NRC by the end of this fiscal year and in FY 2004, we will continue our support of these regulatory demonstration projects to achieve successful NRC staff review and approval of the siting application in 2005.

Key to the deployment of new nuclear power plants, besides a viable site, is selection of a nuclear power plant design and utility application for a combined Construction and Operating License from the NRC. In FY 2003, the Department will solicit and award industry cost-shared projects to implement activities to achieve deployment of new nuclear power plants. This effort includes the necessary analysis and planning for technology selection and project cost determination, additional siting activities as appropriate, advanced reactor development and certification, and demonstration of the combined construction and operating licensing process.

UNIVERSITY REACTOR FUEL ASSISTANCE AND SUPPORT

The Department sponsors the *University Reactor Fuel Assistance and Support* initiative, which supports the enhancement of the U.S. nuclear science and technology educational infrastructure. The need for trained and qualified nuclear scientists has not diminished over the years, and in fact, because of increasing retirements in the nuclear field, demand today exceeds supply.

We are very pleased that the President's budget includes $18.5 million for this program for fellowships, scholarships, nuclear engineering research, and for critical support to university research reactors. In FY 2002, the Department launched the *Innovations in Nuclear Infrastructure and Education* program, encouraging universities to form ground-breaking partnerships with national labs, the private sector, and other universities to strengthen nuclear engineering education and optimize the use of research reactors. In FY 2002, DOE issued awards to four consortia of universities and their partners. In FY 2003, DOE will be able to support an additional award and will continue support for this program in FY 2004.

RADIOLOGICAL FACILITIES MANAGEMENT

This budget request also includes $63 million in funds to maintain critical research, isotope and space and national security power systems facilities at Oak Ridge National Laboratory, Los Alamos National Laboratory, Sandia National Laboratory, and Brookhaven National Laboratory in a safe, secure, and cost effective manner to support national priorities.

The FY 2004 budget request also includes $13 million in funds transferred from the National Nuclear Security Administration to continue the Uranium-233 project at Oak Ridge National Laboratory. This project is aimed at stabilizing materials left over from the Cold War to address a Defense Nuclear Facilities Safety Board recommendation, while extracting isotopes from the uranium that are needed for very promising medical research.

INEEL – DOE'S COMMAND CENTER FOR NUCLEAR R&D

Finally, this budget supports the Secretary's realignment of the mission of the Idaho National Engineering and Environmental Laboratory to focus the future of the site on nuclear research and development. As the Department's leading center of nuclear research and development, this laboratory is the "command center" for our efforts to develop advanced reactor and fuel cycle technologies, including development of space nuclear power and propulsion technologies.

While the nuclear energy program involves the collective talents of universities, the private sector, international partners, and our national laboratories -- Argonne, Los Alamos, Sandia, and Oak Ridge among them -- the rebuilding of the Departments' nuclear program underway today would not be possible without the dedicated scientists, engineers and supporting staff of the Idaho National Engineering and Environmental Laboratory.

Clearly, environmental cleanup will remain a major focus of the Department for the near-term but real progress is being made that will clear the way for expansion of nuclear research and development. With this year's budget, $110 million has been transferred from the environmental cleanup program to the Department's nuclear program to manage laboratory infrastructure and security.

This year's budget request combines the infrastructure for the INEEL previously funded by the Office of Environmental Management, for the Test Reactor Area landlord, and for the infrastructure of Argonne National Laboratory West under the Idaho Facilities Management program. Similarly, the Safeguards and Security program, combines the security funds INEEL and Argonne-West, into a single program. With significantly challenges to security since September 11th, we are very pleased that our current-year appropriation is substantially higher than last year and that the FY 2004 request, at $54 million, is about 13 percent higher than this year.

CONCLUSION

Mr. Chairman, and Members of the Subcommittee, this concludes my prepared statement. I would be pleased to answer any questions you may have.